

WHAT IS CLAIMED IS

1. A light-emitting device, in particular a backlight device, of the type comprising a transparent substrate having a front surface and a rear surface, there being
5 associated to the rear surface means for generating an electromagnetic radiation that is able to pass through the substrate and come out of the front surface, characterized in that it comprises a layer of porous alumina which operates so as to inhibit propagation of
10 said electromagnetic radiation in the directions parallel to the plane of the substrate, thus improving the efficiency of extraction of light from the substrate and increasing the directionality of the emitted light.
- 15 2. The device according to Claim 1, wherein the layer of alumina is obtained on said front surface.
3. The device according to Claim 1, wherein said generating means comprise a first layer of transparent material having the function of electrode and a second
20 layer of material having the function of electrode, between the first and the second layer there being set at least one layer of electroluminescent material.
4. The device according to Claim 3, wherein, between the first and the second layer, there are set, in
25 addition to the layer of electroluminescent material, electrical-charge-transporting layers.
5. The device according to Claim 3, characterized in that the first layer is directly in contact with said rear surface.
- 30 6. The device according to Claim 3 or Claim 5, characterized in that:
- the layer of alumina is obtained on the first layer;
 - on the ensemble formed by the layer of alumina and the first layer, there is set at least one layer of
35 electroluminescent material; and

- the layer of alumina is structured in such a way that the electroluminescent material fills the pores of the alumina so as to be in contact both with the first layer and with the second layer.

5 7. The device according to Claim 3, wherein:

- the layer of alumina is obtained on said rear surface;

- on the layer of alumina there is deposited the first layer so as to coat the internal surfaces of the pores
10 of the alumina; and

- on the ensemble formed by the layer of alumina and the first layer, there is set at least one layer of electroluminescent material, part of which fills the pores of the alumina.

15 8. The device according to Claim 3, wherein the first layer is a layer of ITO or else a layer of percolated or mesoporous material.

9. The device according to Claim 3, wherein the electroluminescent material is selected in the group
20 made up of: organic electroluminescent materials, inorganic and organic semiconductors, metallic nanocrystals, and luminescent rare earths.

10. The device according to Claim 1, wherein said generating means comprise a layer of photoluminescent
25 phosphors designed for converting UV radiation into visible light.

11. The device according to Claim 1, wherein the transparent substrate is constituted by the encapsulating glass of a source of a fluorescent lamp
30 bulb.

12. The device according to Claim 1, wherein the transparent substrate is constituted by the front glass of a cathode-ray tube (CRT) or of a display of a flat-panel type (FPD).

35 13. A method for the fabrication of a light-emitting

device, in particular a backlight device, in which there are envisaged the steps of:

- providing a transparent substrate having a front surface and a rear surface; and

- 5 - associating to the rear surface generating means for generating an electromagnetic radiation that is able to pass through the substrate and come out of the front surface;

the said fabrication method being wherein it comprises
10 a step of anodization of a sheet or film of high-purity aluminium in order to form a layer of porous alumina, which operates so as to inhibit propagation of the light emitted in the directions parallel to the plane of the substrate, and thus improve the efficiency of
15 extraction of light from the substrate and increase the directionality of the light emitted.

14. The method according to Claim 13, in which the layer of alumina is formed directly on said front surface.

- 20 15. The method according to Claim 13, in which the generating means are obtained by deposition of a first layer of transparent material having the function of electrode, a second layer of electroluminescent material, and a third layer of material having the
25 function of electrode.

16. The method according to Claim 15, in which:

- the first layer is deposited directly on said rear surface;

- the layer of alumina is formed on the first layer;

- 30 - the second layer is deposited on the ensemble formed by the layer of alumina and the first layer; and
- on the second layer there is deposited the third layer.

17. The method according to Claim 15, in which:

- 35 - the layer of alumina is formed on said rear surface;

- on the layer of alumina there is deposited the first layer so as to coat the internal surfaces of the pores of the alumina;

- on the ensemble formed by the layer of alumina and the first layer there is deposited the second layer, part of which fills the pores of the alumina; and

- on the second layer there is deposited the third layer.

18. Use of anodized porous alumina as two-dimensional photonic crystal in light-emitting devices and systems, for example backlight devices and systems, in order to inhibit propagation of the light in the directions parallel to the plane of a transparent plate, thus improving the efficiency of extraction of light from the plate and increasing the directionality of the emitted light.

19. Use of anodized porous alumina as two-dimensional photonic crystal in fluorescent lamp bulbs for lighting in order to inhibit propagation of the emitted light in the directions parallel to the plane of a transparent plate, thus improving the efficiency of extraction of light from the plate and increasing the directionality of the light emitted.